Maine State Prison at Warren **Knox County** **Warren, Maine** **A-808-71-A-N**	**Departmental** **Findings of Fact and Order** **Air Emission License** **After-the-Fact**

After review of the air emissions license application, staff investigation reports and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 M.R.S.A., Section 344 and Section 590, the Department finds the following facts:

I. REGISTRATION

A. Introduction

Maine State Prison at Warren (MSPW) of Warren, Maine has applied for an Air Emission License permitting the operation of emission sources associated with their correctional institution.

B. Emission Equipment

MSPW is licensed to operate the following equipment:

Fuel Burning Equipment

Equipment	Maximum Capacity (MMBtu/hr)	Maximum Firing Rate (gal/hr)	Fuel Type, % sulfur	Stack #
Boiler #1	20.9	149.4	#2 fuel oil, 0.3%	1
Boiler #2	20.9	149.4	#2 fuel oil, 0.3%	1
Boiler #3	20.9	149.2	#2 fuel oil, 0.3%	1
Boiler #4	8.4	59.8	#2 fuel oil, 0.3%	1

Electrical Generation Equipment

Equipment	Power Output (kW)	Firing Rate (gal/hr)	Fuel Type, % sulfur	Stack #
Generator #1	1500	110.2	#2 fuel oil, 0.3%	2
Generator #2	1500	110.2	#2 fuel oil, 0.3%	3

MSPW also currently operates two boilers, one rated at 5.23 MMBtu/hr and one at 1.73 MMBtu/hr, as well as a 558 kW generator. These units will be removed upon completion of their expansion project.

C. Application Classification

The new source is considered a major source based on whether or not expected emissions exceed the "Significant Emission Levels" as given in Maine's Air Regulations. The emissions for the new source are determined by the maximum future license allowed emissions, as follows:

Pollutant	**Max. Future License (TPY)**	**Sig. Level**
PM	6.8	100
PM_{10}	6.8	100
SO_2	48.3	100
NO_x	67.3	100
CO	10.0	100
VOC	2.0	50

This source is determined to be a minor new source and has been processed as such.

II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in Chapter 100 of the Air Regulations. Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

BPT for new sources and modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in Chapter 100 of the Air Regulations. BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

B. Boilers

Boilers #1, #2, and #3 are Cleaver-Brooks boilers with a maximum heat input of 20.9 MMBtu/hr each. Boiler #4 is a Cleaver-Brooks boiler with a maximum heat input of 8.4 MMBtu/hr.

Boilers #1, #2, and #3 were manufactured in 2000 and have heat inputs greater than 10 MMBtu/hr each. These boilers are therefore subject to the New Source Performance Standards (NSPS) Subpart Dc for steam generating units.

Boiler #4 has a heat input of less than 10 MMBtu/hr, and is therefore not subject to NSPS Subpart Dc for steam generating units.

A summary of the BACT analysis for Boilers #1, #2, and #3 (20.9 MMBtu/hr each) and Boiler #4 (8.4 MMBtu/hr) is the following:

1. The total fuel use for the facility shall not exceed 2,300,000 gal/year of #2 fuel oil, based on a 12 month rolling total, with a maximum sulfur content not to exceed 0.3% by weight.
2. MSPW shall not fire more than two of Boilers #1, #2, or #3 simultaneously demonstrated by recordkeeping including firing dates and times for each boiler.
3. Chapter 106 regulates fuel sulfur content, however in this case a BACT analysis for SO2 determined a more stringent limit of 0.3% was appropriate and shall be used.
4. Chapter 103 regulates PM emission limits, however in this case a BACT analysis for PM determined a more stringent limit of 0.04 lb/MMBtu was appropriate and shall be used. The PM_{10} limits are derived from the PM limits.
5. NO_x emission limits are based on data from similar #2 fired boilers of this size and age.
6. CO and VOC emission limits are based upon AP-42 data dated 9/98.
7. Visible emissions from the boilers shall not exceed 20% opacity on a 6 minute block average.

C. Generators

MSPW operates two back-up emergency generators. These generators draw fuel from the same tank as the boilers. In order to do this they have accepted an operating restriction of 300 hours/year for each generator. A summary of the BACT analysis for Generators #1 and #2 (1500 kW each) is the following:

1. The generators shall fire #2 fuel oil with a maximum sulfur content not to exceed 0.3% by weight.
2. The emergency generators shall each be limited to 300 hr/yr of operation based on a 12 month rolling total. Compliance shall be demonstrated by a written log of all generator operating hours.
3. Chapter 106 regulates fuel sulfur content, however in this case a BACT analysis for SO2 determined a more stringent limit of 0.3% was appropriate and shall be used..
4. Chapter 103 regulates PM emission limits. The PM_{10} limits are derived from the PM limits.
5. NO_x, CO, and VOC emission limits are based upon AP-42 data dated 10/96.

6. Visible emissions from the generators shall not exceed 20% opacity on a 6 minute block average, except for no more than 2 six minute block averages in a continuous 3 hour period.

D. Annual Emission Restrictions

MSPW shall be restricted to the following annual emissions, based on a 12 month rolling total:

Total Allowable Annual Emission for the Facility
(used to calculate the annual license fee)

Pollutant	**Tons/Year**
PM	6.8
PM_{10}	6.8
SO_2	48.3
NO_x	67.3
CO	10.0
VOC	2.0

III. AMBIENT AIR QUALITY ANALYSIS

A. Overview

Screening modeling was performed to show that MSPW's emissions, in conjunction with other sources, would not cause or contribute to violations of Maine Ambient Air Quality Standards (MAAQS) for Sulfur Dioxide (SO_2), Particulate Matter (PM_{10}), Nitrogen Dioxide (NO_2), and Carbon Monoxide (CO) or to Class II increments for SO_2, PM_{10}, and NO_2.

It was determined by MEDEP-BAQ that MSPW is a relatively small source located approximately 45 kilometers from the nearest Class I area and is not likely to affect ambient Class I increment, therefore a Class I analysis was not performed.

B. Model Inputs

The SCREEN3 model was used to determine the worst-case operating load and the SO_2, PM_{10}, NO_2, and CO significant impact areas in simple, intermediate, and complex terrain, i.e. areas where terrain elevations exceed the proposed stack-top elevations. Since MSPW's stack was greater than H + 0.5L (where H is the

height of the controlling structure and L is the lessor of the height or maximum projected width of that structure), no cavity analysis was performed.

All modeling was performed in accordance with all applicable requirements of the Maine Department of Environmental Protection, Bureau of Air Quality (MEDEP-BAQ) and the United States Environmental Protection Agency (USEPA).

Stack parameters used in the modeling for MSPW are listed in Table IV-1. The modeling analyses accounted for the potential of building wake effects on emissions from the MSPW stack which was below formula GEP stack height.

TABLE IV-1. Stack Parameters

Facility/stack	Stack Base Elevation (m)	Stack Height (m)	GEP Stack Ht. (m)	Stack Diameter (m)	UTM E (km)	UTM N (km)
PROPOSED:						
MSPW	49.38	15.24	23.25	1.07	481.50	4878.80

Emission parameters for MSPW used in demonstrating compliance with MAAQS are listed in Table IV-2. For the purpose of determining NO_2 and PM_{10} impacts, all NO_x and PM emissions were conservatively assumed to convert to NO_2 and $PM_{10,}$ respectively.

TABLE IV-2. Emission Parameters

Facility/stack	Operating Scenario	SO2 (g/s)	PM10 (g/s)	NO2 (g/s)	CO (g/s)	Temp (°K)	Stack Vel. (m/s)
PROPOSED:							
MSWP	50%	1.34	0.18	1.34	0.16	458.7	4.57
MSWP	75%	2.02	0.27	2.02	0.24	458.7	6.86
BASELINE 1977 & 1987:							
MSWP	Not in existence						

Key: Shaded = not modeled

C. Applicant's modeled impacts.

SCREEN3 modeling analyses were performed for the typical (75% of maximum operating case emission and stack velocity), and minimum (50% of maximum operating case emission and stack velocity) operating load cases for MSPW's facility alone. It was demonstrated that the typical operating load case would result in maximum impacts which meet increment standards in simple, intermediate, and complex terrain; thus the minimum load case was not examined

further. The SCREEN3 model results for MSPW's facility are shown in Table IV-3. Pollutants that exceed their significance levels are indicated in bold type.

TABLE IV-3. Maximum SCREEN3 Predicted Impacts from MSPW Alone

Pollutant	Averaging Period	Maximum Impact Simple Terrain ($\mu g/m^3$)	Maximum Impact Complex Terrain ($\mu g/m^3$)	Class II Significance Level ($\mu g/m^3$)
SO_2	3-hour	**97.87**	**201.04**	**25**
	24-hour	**43.50**	**89.35**	**5**
	Annual	**8.70**	**17.87**	**1**
PM_{10}	24-hour	**5.80**	**11.92**	**5**
	Annual	**1.16**	**2.38**	**1**
NO_2	Annual	**8.70**	**17.87**	**1**
CO	1-hour	13.05	26.81	**2000**
	8-hour	9.14	18.77	**500**

D. Combined Source Modeling

Because modeled impacts from MSPW's facility were greater than significance levels for all SO_2, PM_{10}, and NO_2 averaging periods in simple and complex terrain, other sources not explicitly included in the modeling analysis must be included by using representative background concentrations for the area. Background concentrations used were based on conservative central Maine rural background monitoring data from data collected for SO_2 from Dedham, Bald Mountain site, for PM_{10} from data collected from the Jay (Crash Road) site, and for data collected for NO_2 from the Portland area (PEOPL Site). These background values are listed in Table IV-4.

TABLE IV-4. Background Concentrations ($\mu g/m^3$)

Pollutant	Averaging Period	Background
SO_2	3-hour	52
	24-hour	29
	Annual	5
PM_{10}	24-hour	34
	Annual	14
NO_2	Annual	11

MEDEP-BAQ examined other sources whose impacts would potentially be significant in or near MSPW's facility's significant impact area. Due to the applicant's location, extent of the significant impact area and nearby source emissions, MEDEP-BAQ has determined that no other sources would be required for combined source modeling.

Table IV-5 summarizes the maximum SCREEN3 combined source impacts. The predicted impacts were added to conservative background concentrations to demonstrate compliance with MAAQS. All combined source SO_2, PM_{10}, and NO_2 averaging period impacts from MSPW's facility were below their respective MAAQS.

TABLE IV-5 Maximum SCREEN3 Combined Source Impacts in Simple and Complex Terrain

Pollutant	Averaging Period	Maximum Impact Simple Terrain ($\mu g/m^3$)	Maximum Impact Complex Terrain ($\mu g/m^3$)	Background ($\mu g/m^3$)	Maximum Total Impact ($\mu g/m^3$)	MAAQS ($\mu g/m^3$)
SO_2	3-hour	97.87	201.04	52	253.04	**1150**
	24-hour	43.50	89.35	29	118.35	**230**
	Annual	8.70	17.87	5	22.87	**57**
PM_{10}	24-hour	5.80	11.92	34	45.92	**150**
	Annual	1.16	2.38	14	16.38	**40**
NO_2	Annual	8.70	17.87	11	28.87	**100**

E. Class II Increment

Class II increment analyses require inclusion of Area Source and Mobile Source NO_x emissions.

1. Area Source Growth

Population growth in Knox County can be used as a surrogate factor for the growth in the emissions from residential combustion sources. Information from the U.S. Census Bureau estimates that the population in Knox County was 36,419 in 1990 and 38,193 in 1999 for a net increase of 4.9% between 1990 and 1999. Because of the low percentage of growth in area source emissions, a detailed analysis of area source emissions of NO_x was not required.

2. Mobile Source Growth

Growth in vehicle miles traveled (VMT) can be used to determine the growth in NO_x emissions in the impact area of the proposed source. MEDEP-BAQ performed motor vehicle emission model runs for the period of 1987 to 1998. A VMT growth for this same period of 38% for Knox County combined with known controls in mobile source NO_x emissions causes insignificant growth of NO_x in this time period. Hence, further detailed analysis of mobile NO_x emissions are not needed.

As a result, MEDEP-BAQ determined that insignificant NO_2 increment has been consumed by mobile and area sources in Knox County. Thus, only point sources need to be considered in the increment analysis.

MSPW's emissions are totally increment consuming, therefore SCREEN3 in simple and complex terrain was used to demonstrate that SO_2, PM_{10}, and NO_2 increments would not be violated by MSPW alone. Due to MSPW's location, extent of the significant impact area and nearby source's emissions, it has been determined that no other sources would be required for combined source increment modeling. Table IV-7 summarizes Class II increment consumption in simple and complex terrain for MSPW alone.

TABLE IV-7 Maximum SCREEN3 Combined Source Class II Increment in All Terrain

Pollutant	Averaging Period	Maximum Impact Simple Terrain ($\mu g/m^3$)	Maximum Impact Complex Terrain ($\mu g/m^3$)	Class II Increment ($\mu g/m^3$)
SO_2	3-hour	97.87	201.04	**512**
	24-hour	43.50	89.35	**91**
	Annual	8.70	17.87	**20**
PM_{10}	24-hour	5.80	11.92	**30**
	Annual	1.16	2.38	**17**
NO_2	Annual	8.70	17.87	**25**

F. Summary

In summary, it has been demonstrated that MSPW's facility in its proposed configuration (operating at not more than 75% of maximum) will not cause or contribute to a violation of any SO_2, PM_{10}, NO_2, and CO averaging period MAAQS or Class II increment.

ORDER

Based on the above Findings and subject to conditions listed below, the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards,
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants Air Emission License A-808-71-A-N subject to the following conditions:

(1) Employees and authorized representatives of the Department shall be allowed access to the licensee's premises during business hours, or any time during which any emissions units are in operation, and at such other times as the Department deems necessary for the purpose of performing tests, collecting samples, conducting inspections, or examining and copying records relating to emissions.

(2) The licensee shall acquire a new or amended air emission license prior to commencing construction of a modification, unless specifically provided for in Chapter 115.

(3) Approval to construct shall become invalid if the source has not commenced construction within eighteen (18) months after receipt of such approval or if construction is discontinued for a period of eighteen (18) months or more. The Department may extend this time period upon a satisfactory showing that an extension is justified, but may condition such extension upon a review of either the control technology analysis or the ambient air quality standards analysis, or both.

(4) The licensee shall establish and maintain a continuing program of best management practices for suppression of fugitive particulate matter during any period of construction, reconstruction, or operation which may result in fugitive dust, and shall submit a description of the program to the Department upon request.

(5) The licensee shall pay the annual air emission license fee to the Department, calculated pursuant to Title 38 M.R.S.A. § 353.

(6) The license does not convey any property rights of any sort, or any exclusive privilege.

(7) The licensee shall maintain and operate all emission units and air pollution systems required by the air emission license in a manner consistent with good air pollution control practice for minimizing emissions.

(8) The licensee shall maintain sufficient records to accurately document compliance with emission standards and license conditions and shall maintain such records for a minimum of six (6) years. The records shall be submitted to the Department upon written request.

(9) The licensee shall comply with all terms and conditions of the air emission license. The filing of an appeal by the licensee, the notification of planned changes or anticipated noncompliance by the licensee, or the filing of an application by the licensee for a renewal of a license or amendment shall not stay any condition of the license.

(10) The licensee may not use as a defense in an enforcement action that the disruption, cessation, or reduction of licensed operations would have been necessary in order to maintain compliance with the conditions of the air emission license.

(11) In accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department, the licensee shall:

(i) perform stack testing to demonstrate compliance with the applicable emission standards under circumstances representative of the facility's normal process and operating conditions:

a. within sixty (60) calendar days of receipt of a notification to test from the Department or EPA, if visible emissions, equipment operating parameters, staff inspection, air monitoring or other cause indicate to the Department that equipment may be operating out of compliance with emission standards or license conditions; or

b. pursuant to any other requirement of this license to perform stack testing.

(ii) install or make provisions to install test ports that meet the criteria of 40 CFR Part 60, Appendix A, and test platforms, if necessary, and other accommodations necessary to allow emission testing; and

(iii) submit a written report to the Department within thirty (30) days from date of test completion.

(12) If the results of a stack test performed under circumstances representative of the facility's normal process and operating conditions indicate emissions in excess of the applicable standards, then:

(i) within thirty (30) days following receipt of such test results, the licensee shall re-test the non-complying emission source under circumstances

representative of the facility's normal process and operating conditions and in accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department; and

(ii) the days of violation shall be presumed to include the date of stack test and each and every day of operation thereafter until compliance is demonstrated under normal and representative process and operating conditions, except to the extent that the facility can prove to the satisfaction of the Department that there were intervening days during which no violation occurred or that the violation was not continuing in nature; and

(iii) the licensee may, upon the approval of the Department following the successful demonstration of compliance at alternative load conditions, operate under such alternative load conditions on an interim basis prior to a demonstration of compliance under normal and representative process and operating conditions.

(13) Notwithstanding any other provisions in the State Implementation Plan approved by the EPA or Section 114(a) of the CAA, any credible evidence may be used for the purpose of establishing whether a person has violated or is in violation of any statute, regulation, or Part 70 license requirement.

(14) The licensee shall maintain records of malfunctions, failures, downtime, and any other similar change in operation of air pollution control systems or the emissions unit itself that would affect emission and that is not consistent with the terms and conditions of the air emission license. The licensee shall notify the Department within two (2) days or the next state working day, whichever is later, of such occasions where such changes result in an increase of emissions. The licensee shall report all excess emissions in the units of the applicable emission limitation.

(15) Upon written request from the Department, the licensee shall establish and maintain such records, make such reports, install, use and maintain such monitoring equipment, sample such emissions (in accordance with such methods, at such locations, at such intervals, and in such a manner as the Department shall prescribe), and provide other information as the Department may reasonably require to determine the licensee's compliance status.

(16) **Boilers**

A. Heat input capacity shall not exceed 20.9 MMBtu/hr each for Boilers #1, #2, & #3 and 8.4 MMBtu/hr for Boiler #4.

B. Fuel use shall not exceed 2,300,000 gal/yr of #2 fuel oil (12 month rolling total) with a maximum sulfur content not to exceed 0.3% by weight. Fuel records, including gallons used and percent sulfur, shall be maintained on a monthly basis, in addition to the 12 month rolling total.

C. MSPW shall not fire more than two of Boilers #1, #2, or #3 simultaneously documented by recordkeeping including firing dates and times for each boiler.
D. Emissions shall not exceed the following:

Equipment		**PM**	**PM_{10}**	**SO_2**	**NO_x**	**CO**	**VOC**
Boiler #1	lb/MMBtu	0.04	-	-	-	-	-
	lb/hr	0.84	0.84	6.28	6.28	0.75	0.03
Boiler #2	lb/MMBtu	0.04	-	-	-	-	-
	lb/hr	0.84	0.84	6.28	6.28	0.75	0.03
Boiler #3	lb/MMBtu	0.04	-	-	-	-	-
	lb/hr	0.84	0.84	6.28	6.28	0.75	0.03
Boiler #4	lb/MMBtu	0.04	-	-	-	-	-
	lb/hr	0.33	0.33	2.51	2.51	0.30	0.02

E. Visible emissions from Boilers #1, #2, #3 & #4 shall not exceed 20% opacity on a 6 minute block average.

(17) **NSPS Requirements**

The following requirements apply to Boilers #1, #2, and #3:

A. MSPW shall comply with all operating and documentation requirements of 40 CFR Part 60 Subpart Dc (NSPS).
B. MSPW shall submit notification of construction and startup to the Administrator per 40 CFR 60.48c(a).
C. MSPW shall demonstrate initial compliance with the NSPS SO_2 limit as required by 40 CFR 60.44c(h) by submitting to the Administrator a fuel supplier certification in accordance with 40 CFR 60.48c(f)(1).
D. MSPW shall record and maintain records of the amount of fuel fired each day in accordance with 40 CFR 60.48c(g).
E. MSPW shall submit semi-annual reports to the Administrator which include the information listed in 40 CFR 60.48c(e).

(18) **Emergency Generators**

A. Capacity shall not exceed 1500 kW each for Generator #1 and Generator #2.
B. Facility shall limit the Generators #1 and #2 to 300 hr/yr of operation (based on a 12 month rolling total).
C. Generators #1 and #2 shall be equipped with hour meters and a written log shall be maintained of all operating hours to demonstrate compliance with the 300 hr/yr operational limit.
D. The Emergency Generator shall fire #2 fuel oil with a sulfur limit not to exceed 0.3% by weight. Fuel records, including percent sulfur, shall be maintained.

E. Emissions shall not exceed the following:

Equipment		**PM**	**PM_{10}**	**SO_2**	**NO_x**	**CO**	**VOC**
Generator #1	lb/MMBtu	0.12	-	-	-	-	-
	lb/hr	1.85	1.85	4.63	49.38	13.12	1.39
Generator #2	lb/MMBtu	0.12	-	-	-	-	-
	lb/hr	1.85	1.85	4.63	49.38	13.12	1.39

F. Visible emissions from Generators #1 and #2 shall not exceed 20% opacity on a 6 minute block average, except for no more than 2 six minute block averages in a continuous 3 hour period.

(19) The term of this Order shall be for five (5) years from the signature below.

DONE AND DATED IN AUGUSTA, MAINE THIS DAY OF 2001.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY:_____
MARTHA G. KIRKPATRICK, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 11/13/00
Date of application acceptance: 11/22/00

Date filed with the Board of Environmental Protection: _____

This Order prepared by Lynn Ross, Bureau of Air Quality.